

REMARKS

Reconsideration of this application and allowance of the pending claims are respectfully requested. Applicants have attempted to address every objection and ground for rejection in the Office Action dated September 17, 2003 and believe the application is now in condition for allowance. The claims have been amended to more clearly describe the present invention.

Claims 1, 2, 4, 5 and 7-14 stand rejected under 35 U.S.C. §112, first paragraph as not being enabling. The Examiner states that the claims fail to recite essential elements of the claimed system.

Claim 1 is directed to the controller. As such, this claim has been amended to recite a means for detecting when the resin is saturated with hard water ions and a means for detecting when current demand for water is at or below a predetermined flow rate. Claim 8 claims the entire water softening system, therefore these elements have been added to the body of the claim.

All claims stand rejected under 35 U.S.C. § 103(a) as being obvious over DeVale et al. in U.S. Patent No. 4,536,845 ("DeVale"). Applicants respectfully traverse this rejection. There is no suggestion or motivation to motivate DeVale in a manner that renders the subject claims obvious. Even if DeVale were modified, all claim limitations are not taught by the prior art.

To establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990). Second, there must be a reasonable expectation of success. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims prima facie obvious. *In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959). Finally, to establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). "All words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970). If an independent claim is nonobvious under 35 U.S.C. § 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988).

There is no motive to modify the reference by equipping DeVale with a hardness sensor in order to determine when the resin is saturated with hard water ions. DeVale discloses a system for programming a controller for a water softener utilizing various inputs to determine whether recharging is appropriate. DeVale does suggest that the condition of the ion exchange resin is one "event" that may be useful, but fails to disclose what condition is being identified. There is no teaching or suggestion that the condition sought to be identified is the degree of saturation of the ion exchange resin with hard water ions. Absent such a teaching, there is no motivation for one skilled in the art to select a hardness sensor, especially since DeVale does not teach or suggest that the degree of saturation of the resin is used to determine if regeneration should be initiated.

DeVale does not consider the problem of making a compact water softener having a minimum volume of resin. A 24-hour reserve capacity is disclosed in col. 1, line 23, and there is no discussion as to the desirability of changing the amount of reserve resin under any circumstances. The cited reference considers the question, "is recharge required?" (Fig. 2) but does not specifically consider, "is the resin saturated?" Where there is a large resin reserve, "is recharge required" would be interpreted by one skilled in the art to mean "is the resin likely to become saturated before the next recharge hour?" Since it would be unsuitable for the household to be without softened water for up to 24 hours, the resin would not already be saturated at the time the determination is made to regenerate the resin. Thus,

one skilled in the art is not likely to add a hardness sensor to DeVale to determine when the resin is saturated, because there is no motivation to do so based on the failure of DeVale to disclose that the degree of saturation of the resin is of interest, and because DeVale does not consider Applicant's problem of minimizing the resin reserve.

In addition, even if all features suggested by the Examiner were included in DeVale, it still would not disclose all features of Applicants' claims. DeVale fails to disclose regeneration when the resin is saturated or when current water usage is at or below a predetermined flow rate. The reference also fails to suggest that regeneration is initiated without regard to time as now required in Applicants' amended claims. Without disclosure of all claim features, the obviousness rejection is improper.

The process of DeVale monitors water usage and learns that water usage is nil or low during certain time fractions during the day. Using this stored information, the controller "automatically determin[es] a time fraction,... when water is unlikely to be used" then "recharge[es] the water conditioner during the determined time fraction...if recharging is required." See Col. 1, lines 55-61. In FIG. 2, there is a "Time Out" between the determination of no water usage and the initiation of regeneration. In FIG. 6, the unit is recharged only if the recharge hour has arrived. There is no teaching or suggestion that regeneration occurs when the current water usage is actually below a predetermined rate, only that a time fraction is selected where water usage is likely to be low.

The cited reference determines whether recharging is needed and suggests that the “condition of an ion exchange resin bed” may be sensed to determine whether recharging is needed. However, there is no specific disclosure that saturation is the condition being sought. Further, as discussed above, since DeVale builds a time delay into the determination as to when to initiate regeneration, the resin is not already saturated (or very nearly saturated as discussed in the specification) at the time the determination to regenerate is made. Even if the hardness sensor were present in DeVale, the sensed condition would only be used to determine if regeneration were needed before the next recharge hour, and not to immediately initiate regeneration if the resin is saturated.

DeVale further teaches that once it is determined that recharging is required, there is a time delay until the next time fraction when water usage is likely to be low. Even during the initialization period shown in FIG. 2, there is a “Time Out” between the determination that there is no water usage and initiation of regeneration. Reading water usage values every hour for four weeks, storing the data and determining time fractions of low water usage are key points of the prior art invention. To remove the dependence on regeneration at a predetermined time fraction would improperly change the principle of operation of the prior art invention. Thus, DeVale does not teach or suggest regeneration without regard to time as is featured in the amended claims.

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The Examiner admits that DeVale fails to disclose determination of the hard water ion content of the resin, the hard water sensor, flow meter, valves and cam and suggests that it would be obvious for one skilled in the art to provide a hardness sensor. DeVale provides no motivation to select any of these pieces of apparatus. Even if DeVale is modified as the Examiner suggests, there is no teaching or suggestion that controller initiates the regeneration step under the conditions featured in Applicant's amended claims.

Applicants have successfully traversed the rejection under § 103(a). There is no motivation to modify the prior art as suggested by the Examiner. Even if the reference were modified as suggested, the resulting disclosure would still lack at least three features of Applicants' claims. Applicants therefore respectfully request that this rejection be withdrawn.

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Applicants submit that in view of the above-identified amendments and remarks, the claims in their present form are patentably distinct over the art of record. Allowance of the rejected claims is respectfully requested. Should the Examiner discover there are remaining issues which may be resolved by a telephone interview, he is invited to contact Applicants' undersigned attorney at the telephone number listed below.

Respectfully submitted,

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